"PUBLIC HEARING"

ON

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED EXPANSION OF SUGAR FACTORY CAPACITY FROM 4000 TO 5500 TCD AND CO-GENERATION CAPACITY FROM 12 TO 27 MW

KRISHNA SSK NIYAMIT

AT

ATHANI (KSSKN) SANKONATTI VILLAGE, ATHANI TALUKA, BELGAUM DISTRICT ,KARNATAKA STATE

1.0 INTRODUCTION

Krishna Sahakari Sakkare Karkhane Niyamit, Athani (KSSKN) Sankonatti village, Athani Taluka, Belgaum district ,Karnataka State was registered as a cooperative society in the year 1981. The Krishna Sahakari Karkhane Niyamt, Athani (KSSKN) obtained permission for 2500 TCD sugar mill in the year 1988 and established during the crushing season 2001-02. The command area of the sugar factory has excellent cane potential and the sugarcane grown in this area has high sucrose content. Sugarcane potential of KSSKN from its command area is around 6 lakh tonnes. In view of this, the factory management had further expanded its crushing capacity to 4000 TCD and 12 MW power plant in the year 2006. The industry now proposes to modernize and expand the sugar plant capacity from 4000 TCD to 5500 TCD and cogeneration capacity from 12 MW to 27 MW, as there is substantial increase of sugarcane cultivation in this Region. The availability of sugarcane in the command area increased from 6 lakh MTs to 10 lakh MTs.

1.1 Identification of project

It is Modernization and Expansion of Sugar unit from 4000 TCD to 5500 TCD & additional power generation of 15 MW (12 to 27 MW).

1.2 List of Board Directors

The KSSKN under the dynamic leadership of their Chairman Shri P.C. Savadi has progressed rapidly and helped in making the overall development of industrially. Shri P.C. Savadi continues to provide guidance and assistance for further growth of the factory. The list of the present Board of Directors is as below Table-1.

Table-1 List of Board Directors

Sr. No.	Name	Designation
1	Shri. P.C. Savadi	Chairman
2	Shri. J.A. Patil	Vice Chairman
3	Shri. G.M. Tevaramani	Director
4	Smt R.V. Kulkarni	Director
5	Shri. C.H.Patil	Director
6	Shri. S.D.Nandeshwar	Director
7	Shri. G.M.Jatti	Director
8	Shri. M.L.Patil	Director
9	Shri. B.C.Hanji	Director
10	Smt. N.M.Telasang	Director
11	Shri. R.A.Pattan	Director
12	Shri. N.D.Yakshambi	Director
13	Shri. G.M.Patil	Managing Director

1.3 Brief description of nature of the project

Krishna Sahakari Sakkare Niyamit, (KSSKN), Athani has capacity of 4000TCD of sugar mill and a co generation capacity of 12MW as on date. Now the Management intends to enhance the sugar mill capacity to 5500TCD and co generation project to 27MW for better economic viability as the availability of the sugarcane increased from 6 lakh MT to 10 lakh MT.

1.3.1 Highlights of the Project

Project Proponent	**:**	Krishna Sahakari Sakkare Niyamit, Athani (KSSKN).
Location of the project	**:**	Sankonatti village, Athani Taluka, Belgaum district.
Land	**:**	Total land is 63.13 hectares, Built up area after expansion is 32.35 hectares and Green belt area is 20.23 hectares.
Geographical Location	**:**	16°39'59.74"N and 75° 2'57.25"E.
Nearest City/Town	**:**	Athani is the nearest town 07 Km from the factory.
Road	**:**	Athani–Harugeri State Highway (S.H. 31) is 01 Km away from the factory site.
Railway Station	**:**	Kudchi Railway Station 25 Km from the factory site.
Air Port	**:**	Belgaum is the nearest airport 110 km from the site.
Project	**:**	Expansion and Modernization of Sugar unit from 4000 TCD to 5500 TCD & Cogeneration Power from 12 MW 27 MW.
Product	**:**	• White Sugar: 660 MT/day • Bagasse: 2.46 lakh MT. • Molasses: 6600 MT/Month. • Press Mud: 6270 MT/month. • Power: 27 MW
Running Days	**:**	175 days
Main Raw Material	**:**	• Sugar Cane: 5500 MT/day • Lime : 5.94 MT/day • Sulphur: 2.64 MT/day • Bagasse: 2.46 lakh MT
Water Requirement	**:**	615 m^3/day from Krishna River Permission available.(
Fuel	**:**	1538 MT/day

1.4 Need for the project and its importance to the country and or region

India is the second largest producer of sugar over the globe. With more than 45 millions of sugar cane growers in the country, the bulk of the rural population in India depends, on this industry. One of the agro-based industries in India, the sugar industry is the second largest agricultural industry followed after the textile industry. Karnataka Sugar Industry is one of the most notable and large-scale sugar manufacturing sectors in the country. The sugar factory is now operating at its full pledged capacity. During last five seasons the average recovery recorded by the factory is 12.05% where as sugar loss in Bagasse and in final molasses is 0.742 and 1.131 respectively. Increased irrigation facilities have resulted in higher yield of sugar cane (~18.00 lakh tones) in the area of operation. This has pushed the cane growers to move to other factories for their cane to be crushed. Hence there is a need to expand the crushing facility in the factory. The proposed expansion is also expected to reduce sugar loss in Bagasse and final molasses to 0.62 and 1.05 respectively. Total sugar loss is expected to be reduced by around 0.20 units. Total increase in expected average sugar recovery is by 0.48.

1.5 Demands-Supply Gap

With increase irrigation facilities potential cane area is approximately 20000 Ha. The potential cane production is expected to be 18.00 Lakh tonnes. With the present capacity of 4000 TCD for 175 crushing days, only 7.00 lakh tonnes of cane is being crushed. Hence it is evident that there is a huge demand for crushing.

Demand for energy in India especially in Karnataka is increasing exponentially. Fossil fuels are depleting and on the other hand contributing to air pollution. Uncertainty of rain fall has also been a cause of concern for hydro electric power Generation. Thus expansion of Co gen using Bagasse shall definitely be a bridging stone in filling the energy gap.

1.6 Imports vs. Indigenous production

The raw material, i.e., sugar cane is grown abundantly in India and especially in Karnataka. The sugar manufacture is a simple process and the technology is indigenously available. The indigenous production shall save the foreign exchange that could have been spent due to import. The process is straight line and the technology even for the pollution control/disposal is also available indigenously.

1.7 Export Possibility

The finished product viz. Sugar has export possibility and the surplus power generated form cogeneration will be exported to the local grid.

1.8 Employment Generation (Direct and Indirect) due to the project

The KSSKN requires educated and skilled staff at expanded sugar factory as well as cogeneration unit. This requirement is furnished in Table-2. The indirect employment is anticipated to be plenty, since the project is going to produce surplus power. This power may be used to run various businesses and agricultural activities.

Table-2: Additional man power required

Sr. No	Designation	Number	Remarks
1	Cogeneration Plant Manager	1	Plenty of indirect employment opportunities in Agriculture, Business, Transport, farm related manufacture equipments, service and related sectors.
2	Instrumentation Engineer	3	
3	Mechanical Engineer	4	
4	Electrical Engineer	3	
5	Instrumentation Technicians	4	
6	Electrical Supervisor	1	
7	Fuel/ Ash Handling Supervisor	4	
8	Floor Staff	10	

2.0 PROJECT DESCRIPTION

2.1 Type of project

Modernization cum expansion of existing sugar mill unit from 4000 TCD to 5500 TCD & additional co-generation of 15 MW (12 to 27 MW). Bagasse, a by-product of sugar unit has tremendous potential as a renewable source of energy. Hence, cogeneration unit is interlinked with sugar unit.

2.2 Location with coordinates

The coordinates of the project site- 16°39'59.74"N and 75° 2'57.25"E and location of the factory is given fig No 1,2,3,4,5 and 6.

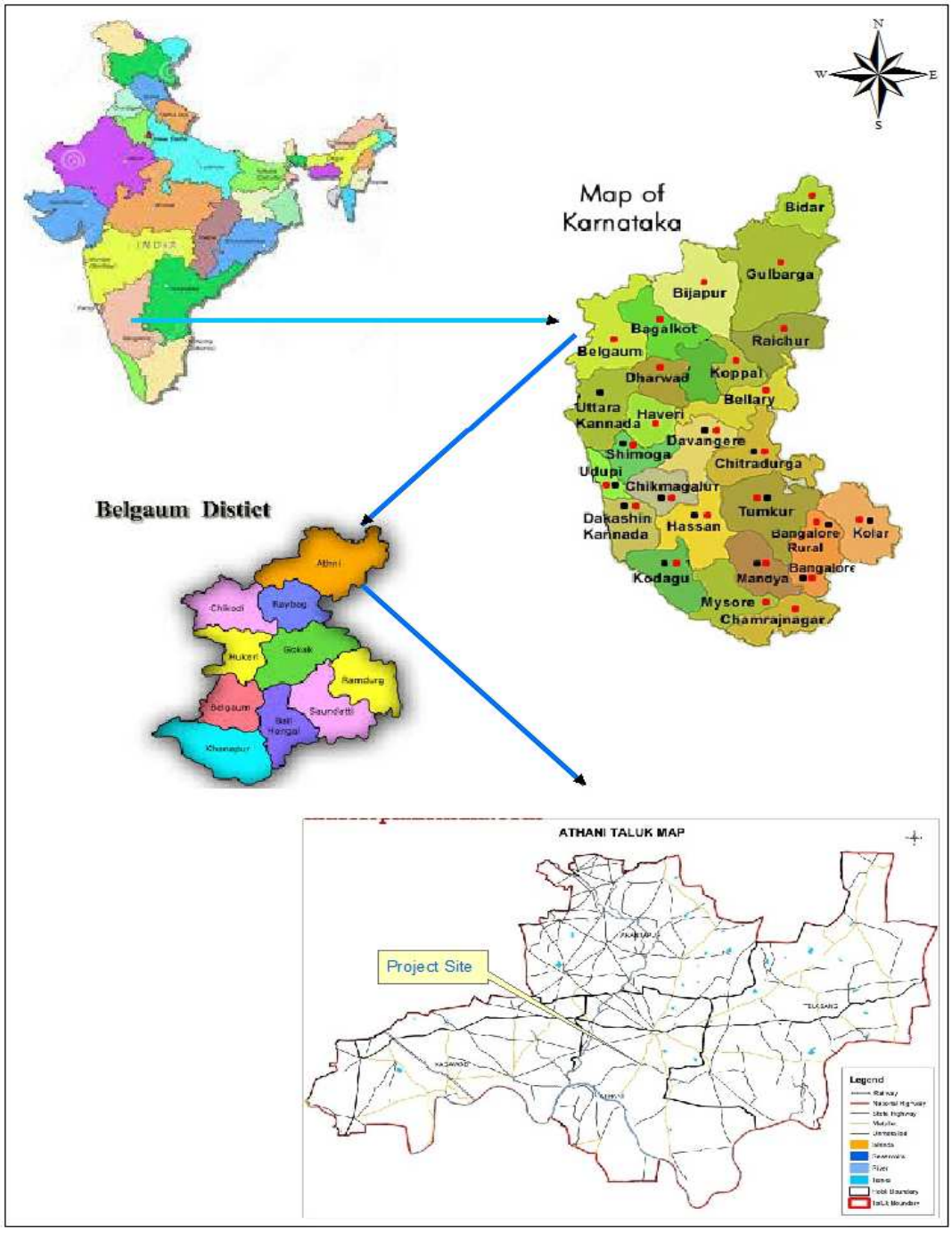


Fig-1 Factory with respect India

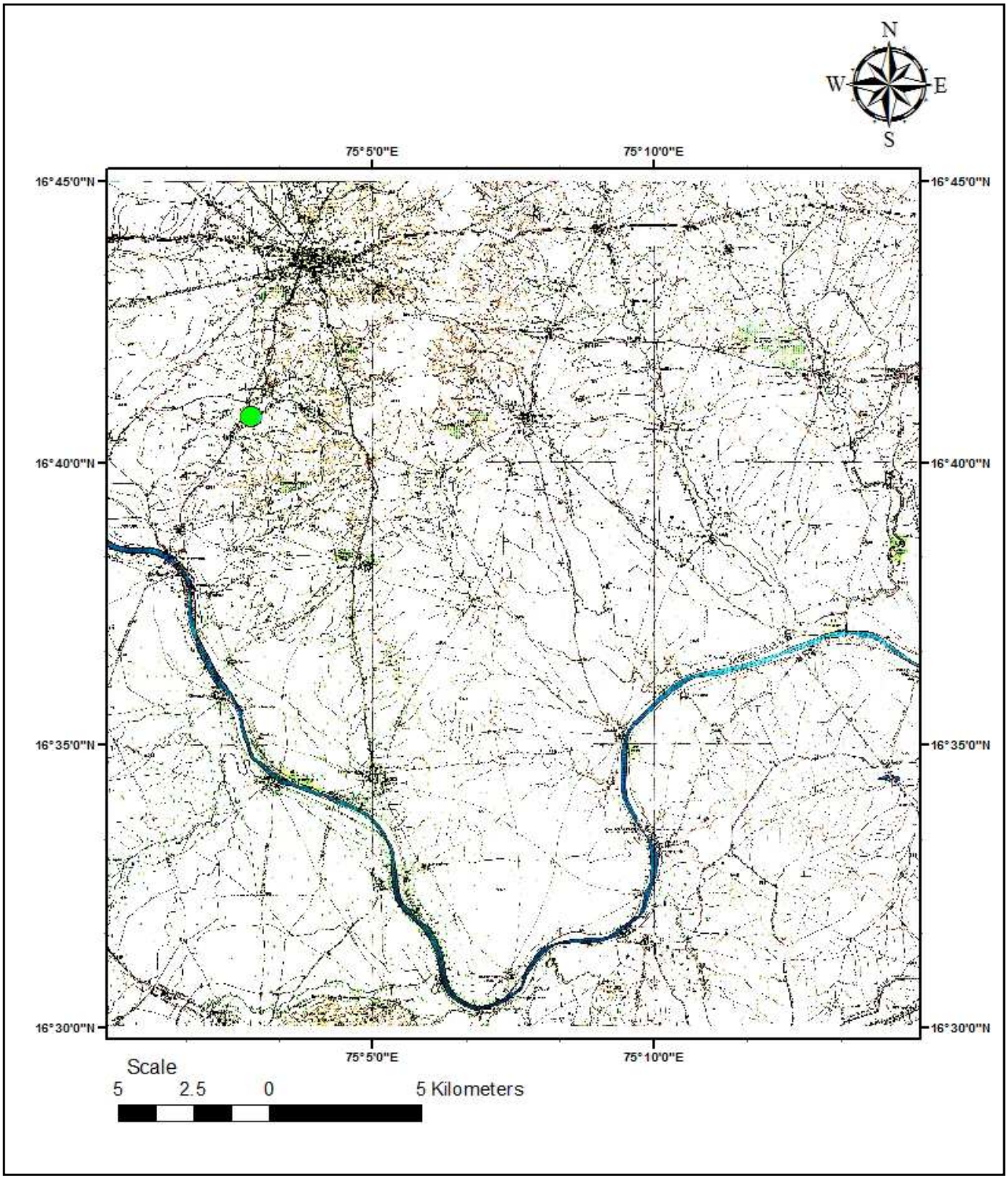


Fig-2 Location of Factory on Topo sheet map of Survey of India

Fig-3 Location of Factory on village map and 10 Km Radius Map from Factory

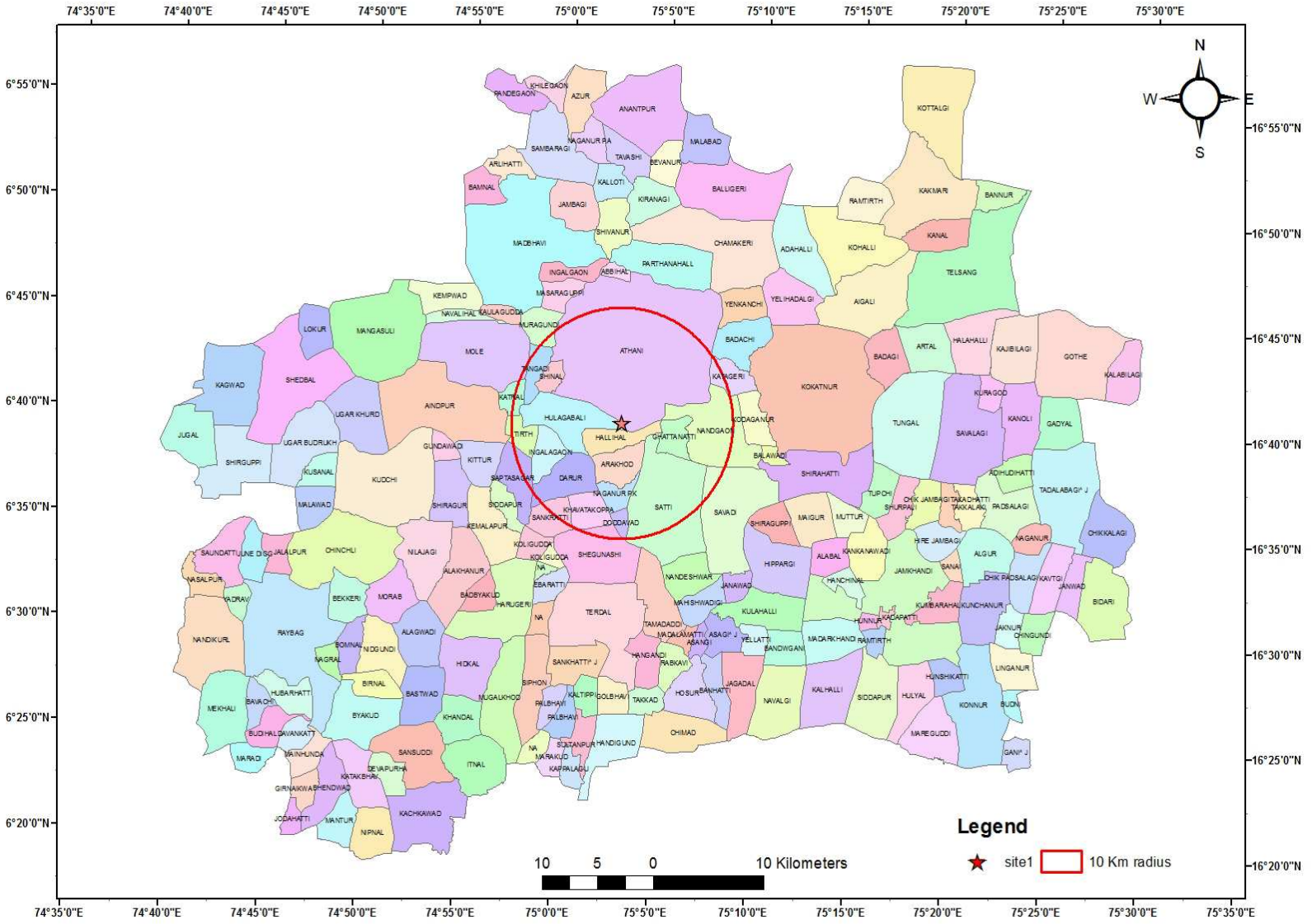


Fig-4 Location of Factory Layout

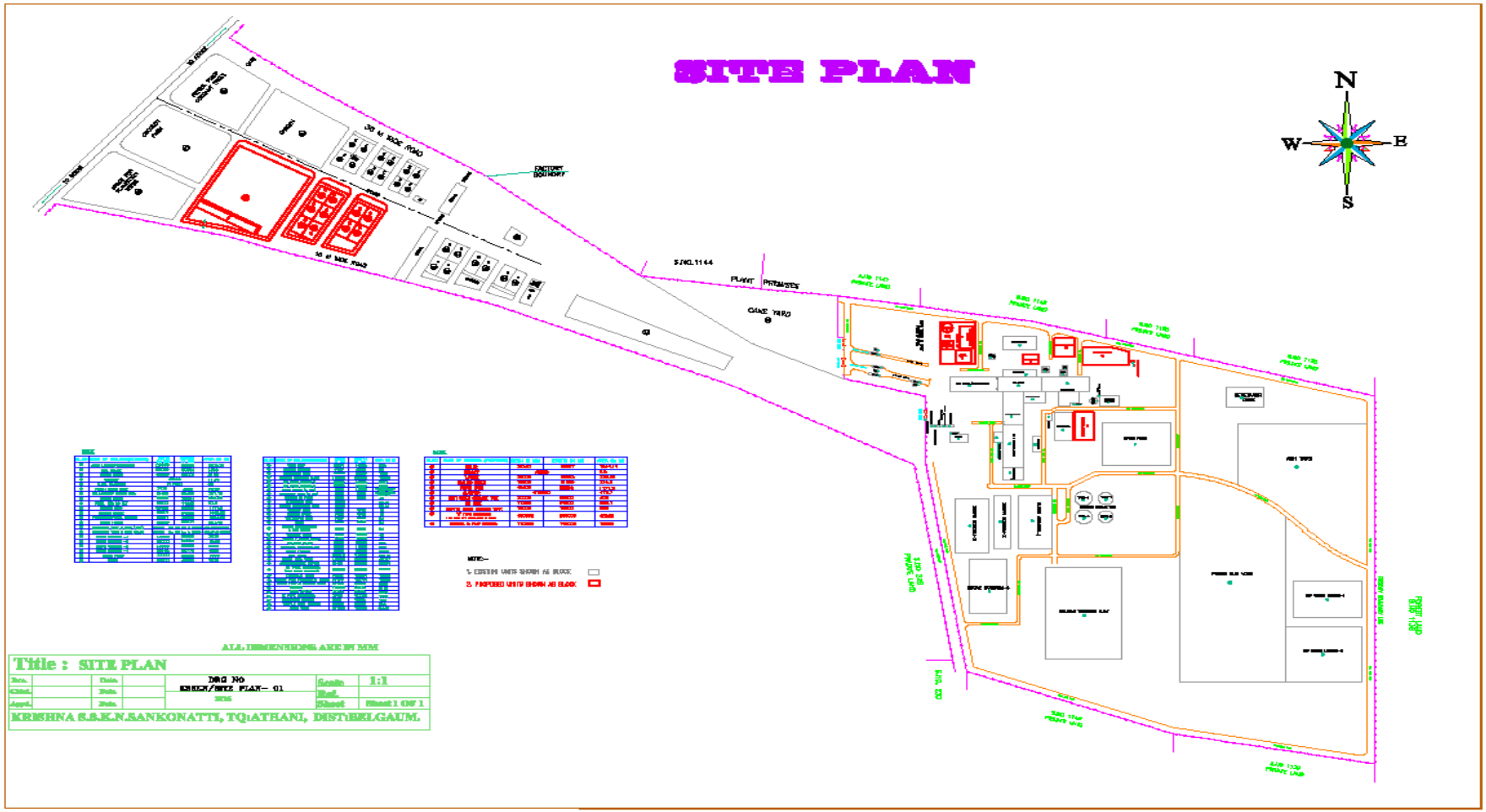


Fig-5 Location of Factory Layout on Google earth with 10 Km radius

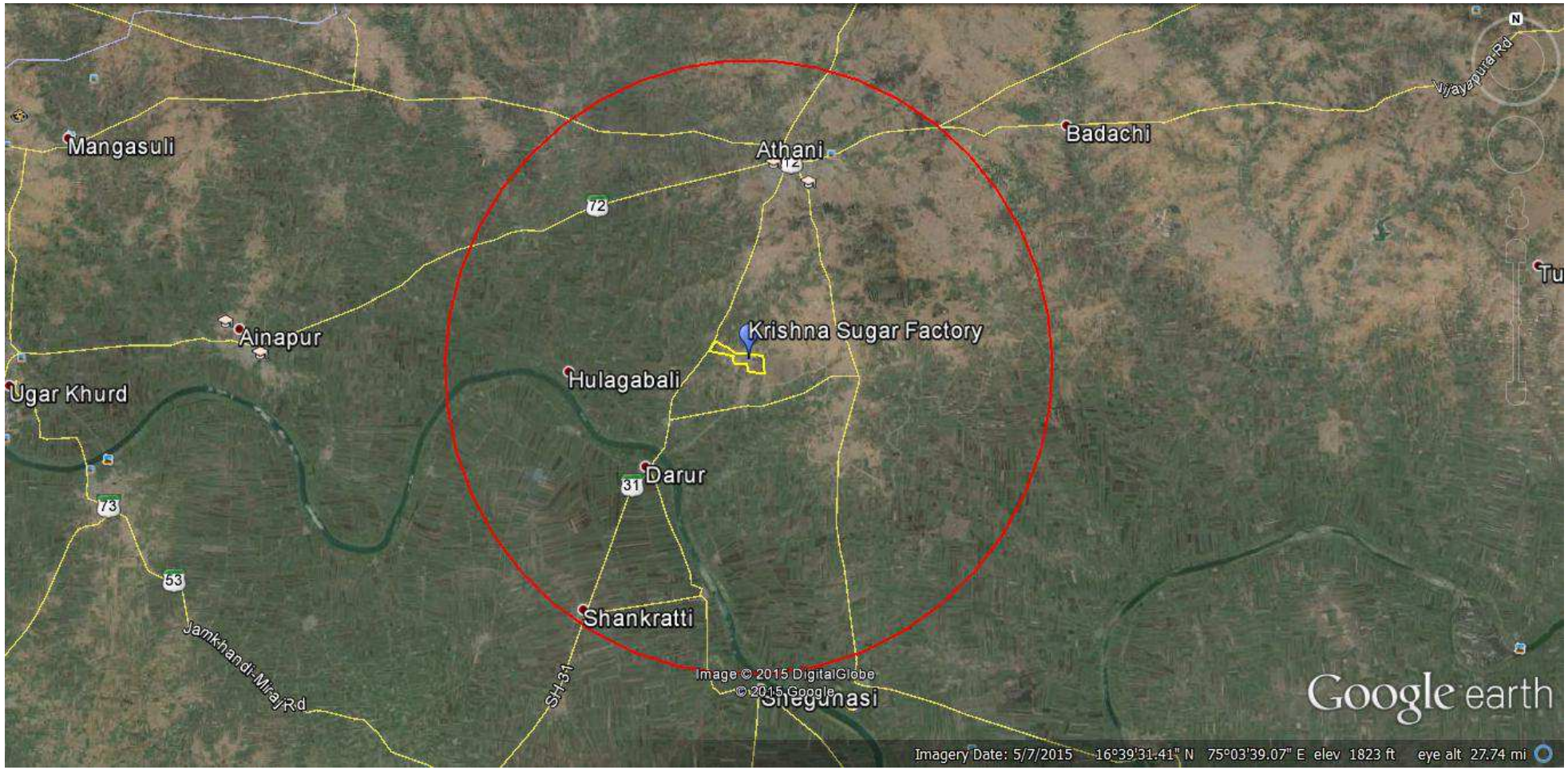


Fig-6 Location of Factory Layout on Google earth

2.3 Details of alternative site considered and basis of selecting the proposed site

Since the proposal is expansion of existing facility, consideration of alternate site does not arise. KSSKN already possess adequate land i.e. more than 63.13 hectors, for the new set up as well as its ancillary units such as pollution control system, greenbelt, etc. Considering these facts, the point of alternative site search becomes irrelevant.

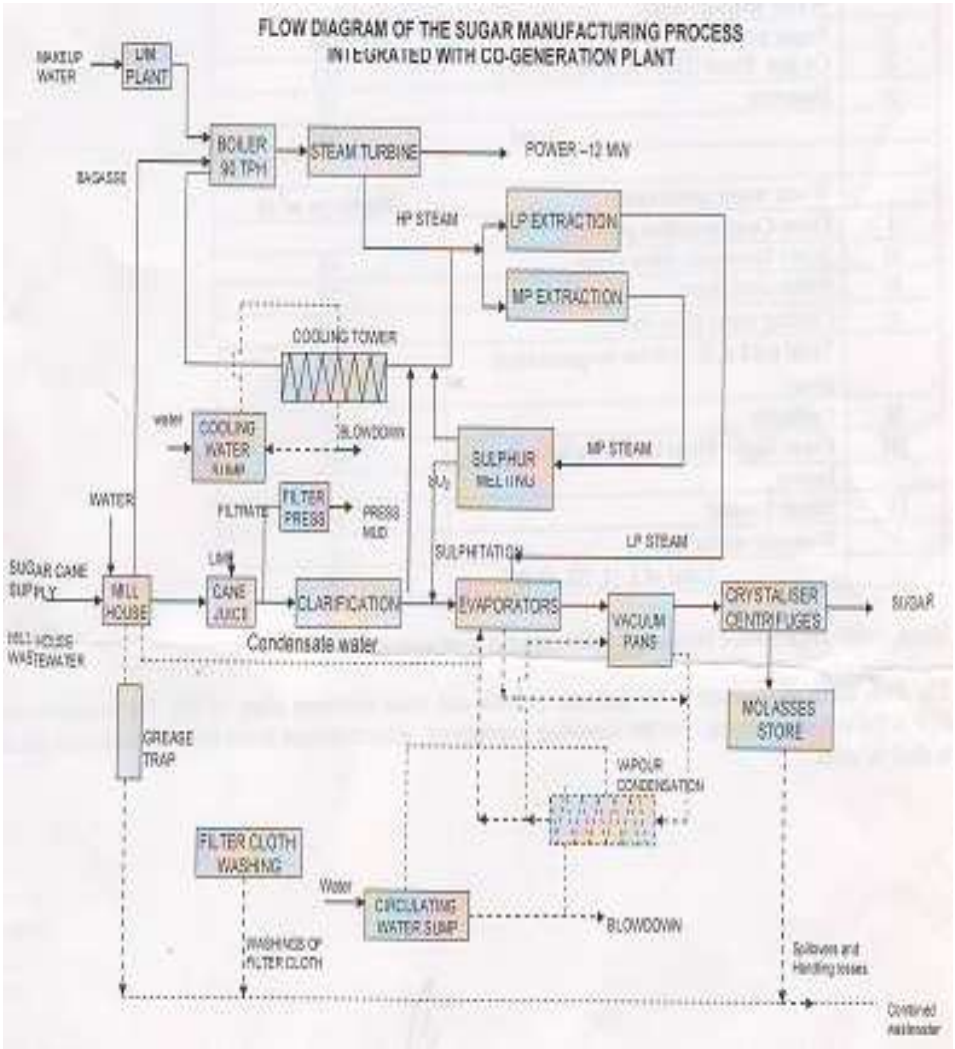
2.4 Size or magnitude of operation

Modernization cum expansion of Sugar unit from 4000 TCD to 5500 TCD & additional power generation of 15 MW (12 to 27 MW).

2.5 Project description with process details

a. Processing of Sugar:

The flow diagram of the sugar manufacturing process



- **Crushing and Extraction of Juice**

The sugarcane is passed through preparatory devices like knives for cutting the stalks into fine chips before being subjected to crushing in a milling tandem comprising 4 to 6 roller mills. In the best milling practice, more than 95% of the sugar in the cane goes into the juice.

- **Clarification**

The treated juice on boiling fed to continuous clarifier from which the clear juice is decanted while the settled impurities known as mud is sent to rotary drum vacuum filter for removal of unwanted stuff called filter cake is discarded or returned to the field as fertilizer.

- **Evaporation**

The syrup is again treated with sulphur dioxide before being sent to the pan station for crystallization of sugar. Crystallization takes place in single-effect vacuum pans, where the syrup is evaporated until saturated with sugar. At this point “seed grain” is added to serve as a nucleus for the sugar crystals, and more syrup is added as water evaporates.

- **Centrifugation**

The massecuite from crystallizer is drawn into revolving machines called centrifuges. The perforated lining retains the sugar crystals, which may be washed with water, if desired. The mother liquor “molasses” passes through the lining because of the centrifugal force exerted and after the sugar is “purged” it is cut down leaving the centrifuge ready for another charge of massecuite.

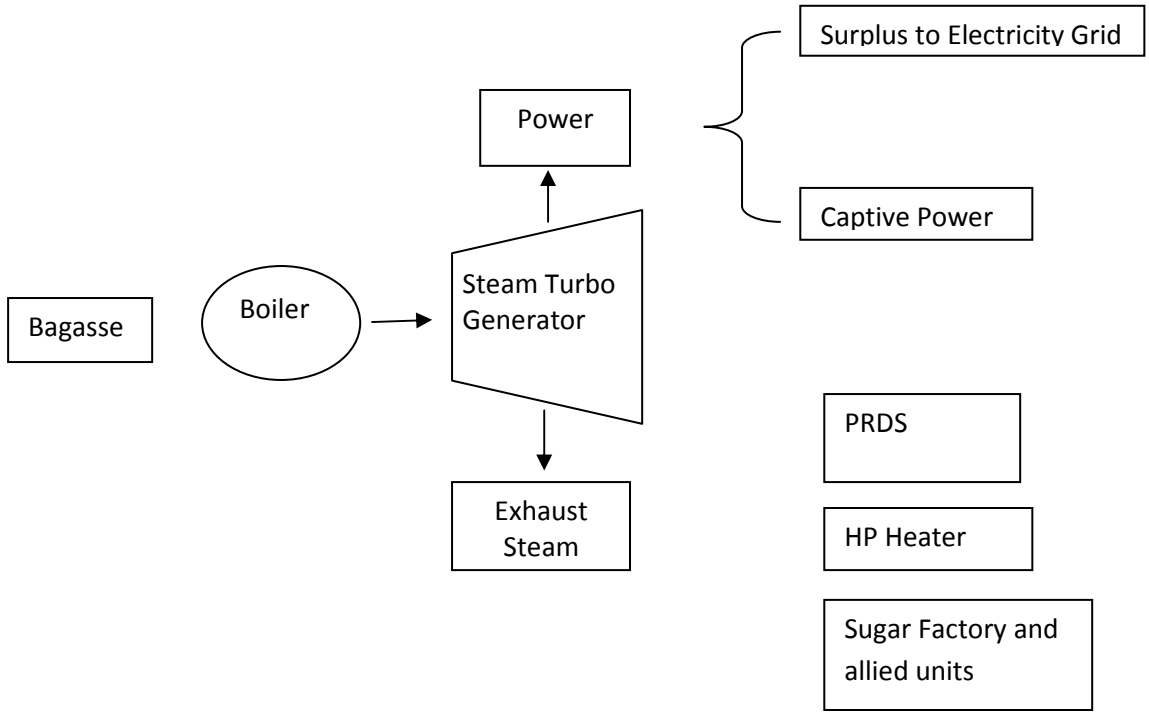
- **Gradation and Packing**

The final product in the form of sugar crystal is dropped through pan section and this sugar is graded and picked in 50 kg bags. The grade of the sugar depends on the size of the crystal viz. Small (S) and Medium (M).

b. Process of Cogeneration

The proposed cogeneration, aims at improving the energy efficiency of the sugar factory significantly and enabling the plant to generate surplus power from its cane crushing operation. This surplus power will be exported to the state electricity grid. Energy efficiency and the export of power to the grid are made feasible due to the availability of high pressure and high temperature steam and by the utilization of the available Bagasse. The process of flow diagram of cogeneration power plant is shown in fig 7.

Fig.7 Process flow diagram of Cogeneration Power plant



2.6 Raw material required along with estimated quantity, likely source, marketing area of final product/s, Mode of transport of raw Material and Finished Product.

The details of the raw material required along with estimated quantity etc are tabulated in the table3.

Table No. 3 Availability raw materials and finish product and transport Mode

Raw Materials	Estimated quantity MT/Day	Source	Transport Mode
Sugar Cane	5500	Local	By Road
Lime	5.94	Goatan, Rajasthan	By Road
Sulphur	2.64	Karnataka & Maharashtra as per the availability	By Road
Bagasse	1538	Own By Product	Conveyor

Final Product	Estimated quantity MT/Day	Source	Transport Mode
White Sugar	660 MT/day	Karnataka, India, Export	By Road
Bagasse	1595	Local	By Road
Molasses	220	Local	By Road
Power	27 MW	Local Grid	By Cable

2.7 Resource optimization/ recycling and reuse envisaged in the project, if any, should be briefly outlined.

Modernize of the existing 4000 TCD sugar factory and install a 1500 TCD unit so as to increase the cane crushing capacity of the KSSKN to 5500 TCD. While doing this, Optimum utilization of the available resource is strived by the management, by using a renewable energy source of Bagasse. Bagasse is a by-product of sugar factory; it will be used as a fuel for boilers that produces process steam. Bagasse-based cogeneration project is an effort for efficient use of available Bagasse and steam to generate the power for to fulfil the captive need and export the surplus to the state grid.

KSSKN proposes to implement the cogeneration project of 27 MW by addition of one no 75 TPH boilers of 110 ATA pressure and 540^0 C temperature and one new T.G. set of 15 MW extraction cum considering type in addition to existing boilers and T.G. Sets. The existing 2 numbers of 6 MW T.G. sets are in operation on matching 46 ATA pressure of existing two numbers boilers. The proposed operation of sugar unit and cogeneration project during season will be operated with 3 numbers. Boilers of existing 2 numbers and new one number and 3 numbers of TG sets of existing 2 numbers and new one number. The total installed capacity of TG sets will be 27 MW. During offseason only one new boiler and 15 MW DEC TG set will be in operation.

2.8 Availability of water its source, Energy/ power requirement and source should be given

The raw water requirement including the proposed expansion is 615 m^3/day which is equilant to the existing water demand. For drinking purpose, the clarified water shall be treated in sand filters and chlorinated. The details are shown in table below – 4.

Table No. 4 Water requirement and availability

Sr. No.	Description	Water Requirement					Source
		Existing	Proposed	Total	Recycling of condensates	Net water requirement	
		4000TCD & 12 MW Co-gen	1500TCD & 15 MW Co-gen	5500TCD and 27 MW Co-gen			
1	Domestic	40	---	40	---	40	Existing Water permission from Krishna river & recycling and reuse of excess condensate after treatment
2	Process	400	150	550	550	Nil	
3	Cooling Water from Spray Pond over flow / Cooling tower blow down / Boiler blow down	215	2000	2215	1640	575	
	Total	**615**	**2150**	**2805**	**2150**	**615**	

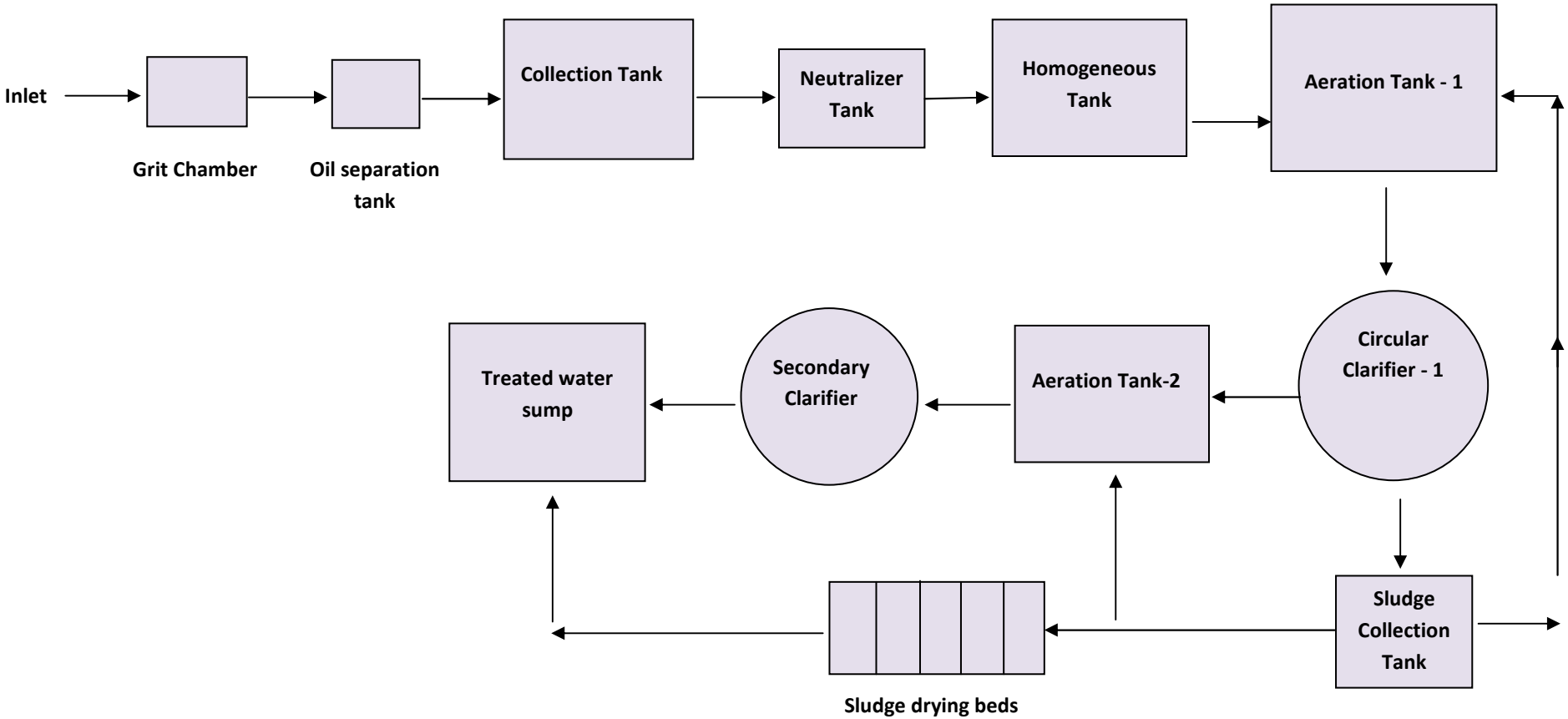
Note: There shall not be any additional requirement of water as the entire excess condensate is recycled back.

2.9 Quantity of by-products generated (liquid and solid) and scheme for their utility. The details given in table 5

Table No. 5. By product Management

Sr. No	By product	Type	Quantity	Upshot
1	Bagasse	Solid	2.46 lakh MT	Used as Fuel for steam & power generation (Sugar/Cogeneration)
2	Molasses	Liquid	6600 MT/Month	Sold to distillery
3	Press mud	Solid	200 MT/day	Used as a raw material for making bio compost / sold as manure.
4	Ash	Solid	23 MT/day	Fly ash sold to Brick Manufacturers/ Composting / manure.

Fig -8 ETP FLOW DIAGRAM



2.10 Justification of ETP for the proposed expansion of the sugar factory

The existing effluent quantity is 615 m^3/day for 4000 TCD sugar and 12 MW co-generation plant. Even after the expansion from 4000 to 5500 TCD and 12 MW to 27 Mw co-generation plant, the effluent quantity shall remain same as 615 m^3/day as it is proposed to adapt recycling and reuse practice for which a separate treatment plant for excess condensate is being provided. Thus, the existing effluent treatment plant would be adequate even after the expansion. The ETP was designed based on two stage aeration principles which are meeting the KSPCB consent standards. The Raw & treated effluent characteristics for the existing capacities are given are below tables 6 and 7. And ETP flow diagram given in fig 8.

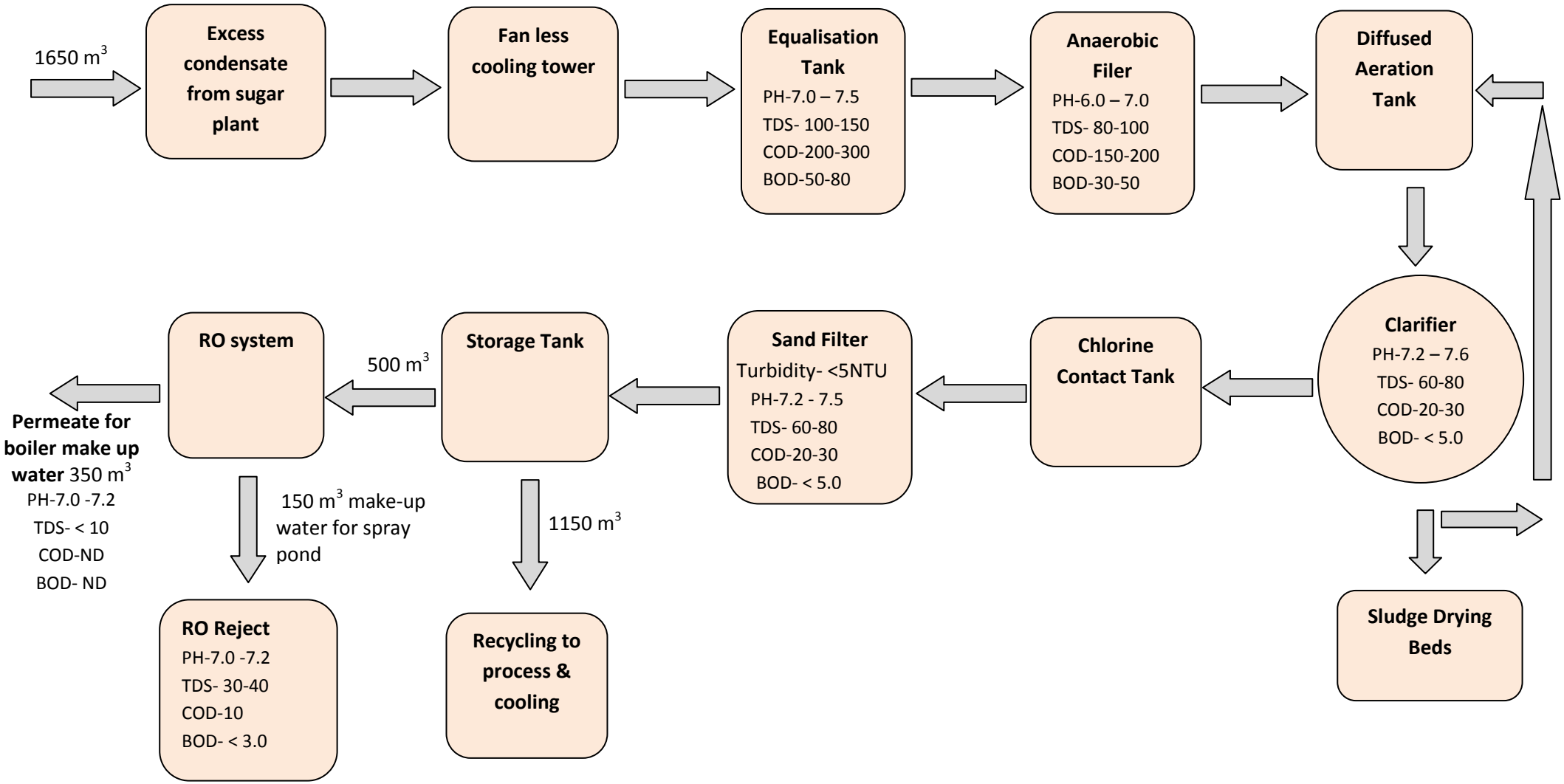
Table-6 for Untreated Sugar Effluent

Sl .No	Parameter	Units	Results
1	PH	---	3.95
2	Electrical Conductivity	µS/cm	2326.00
3	Chemical oxygen Demand	mg/L	5600.00
4	Biological Oxygen Demand	mg/L	2664.00
5	Total Dissolved Solids	mg/L	1500.00
6	Total Suspend Solids	mg/L	694.00
7	Oil & Grease	mg/L	30

Table-7 for ETP-Treated

Sl .No	Parameter	Units	Results
1	PH	---	7.69
2	Electrical Conductivity	µS/cm	1587.00
3	Chemical oxygen Demand	mg/L	156.00
4	Biological Oxygen Demand	mg/L	73.00
5	Total Dissolved Solids	mg/L	1122.00
6	Total Suspend Solids	mg/L	51.00
7	Oil & Grease	mg/L	BDL

Fig -9 .SUGAR CONDENSATE RECYCLING UNIT (1650 KLD)



Note: Except pH, all the units are in mg/l.

2.11 Water recycling unit

The excess condensate amounting to 1650 m3/day is treated based on anaerobic followed by aerobic treatment. The treated effluent is chlorinated & passed through sand filter to eliminate the bacteria & turbidity respectively. When there is a demand for makeup water for the boilers, a part of the treated effluent amounting to 500 m3/day shall be further treated in RO plant. The RO plant permeates shall be used as makeup water for boilers and the reject from the RO plant shall be used as makeup water for spray pond. The treatment plant characteristics at various units are indicated in flow diagram given fig 9.

Executive Summary

1. Krishna Sahakari Sakhare Karkhane Niyamt,Sankonatti ,Athani. proposes to expand sugar factory capacity from 4000 TCD to 5500 TCD and cogeneration power capacity from 12 MW to 27 MW.
2. There will not be any additional land requirement and water for the proposed expansion. The additional power required shall be met from its own cogeneration power plant.
3. The water requirement for the existing capacity would be 615 m^3/day. Additional requirement for the proposed expansion shall be met by recycling the excess condensate by providing condensate polishing unit.
4. The existing treatment plant would be adequate to treat the effluent even after expansion of the project as the existing effluent treatment plant can handle 1000 Cum/day whereas the effluent quantity is only 615 Cum/day.
5. At present 20000 trees are planted in the campus and it is proposed to add 15000 trees which shall cover one third area of the factory area i.e, 20.23 hectares.
6. The existing two Boilers of 40 MT/hr each have wet scrubbers as APC equipment and the 75 MT/hr for the proposed expansion is provided with ESP as APC equipment and adequate stack height of 72 meters.
7. The present environmental status of the project area and the plant area is surveyed in terms of the quality of ambient air, groundwater, soil, noise levels and the stack emissions. All these parameters are found to be well within the limits.
8. The maximum PM_{10} concentration PM $_{2.5}$ concentrations are calculated as 13.51 µg/m^3 at distance of 500 m from the stack at eastern side. As per the existing ambient air quality, the maximum concentration PM_{10} was 68.53 µg/m^3 and for PM $_{2.5}$ was 28. µg/m^3. Thus the maximum PM_{10} and $PM_{2.5}$ concentrations shall be 82.04 µg/m^3 and 41.51 µg/m^3 respectively which are well below the NAAQS of 100 µg/m^3 for PM_{10} and 60 µg/m^3 for PM $_{2.5.}$ for 24 hrs. The NOx and SO2concentrations contributed due to expansion are 3.61 µg/m^3 and 0.58 µg/m^3 are respectively. Thus the maximum NOx concentration is 19.63 µg/m^3 which is well below the NAAQS of 80 µg/m^3 for 24 hrs and the maximum SO2 concentration is 6.51 µg/m^3. Which are well below the NAAQS of 80 µg/m^3 for 24 hrs.

9. The impacts and mitigation measures during constructional and operational phases are given and also the post monitoring plan is submitted.
10. Rain water harvesting is being implemented.
11. Occupational health and safety of the employees are being regularly monitored and found to be normal health conditions for the employees in all sections. However, tobacco chewing and smoking is found to be common and the Management strictly prohibits smoking and chewing of the employees in the work place.
12. Risk analysis and Disaster Management plan is prepared and presented in the EIA report.
13. Land use Study indicate that two villages have canal irrigation, one village tank irrigation and one village of wells and tube well irrigation and Seventeen villages with lift irrigation facilities.
14. The Ground water table is getting depleted due to excess irrigation and also the quality of Ground water in terms of total dissolved solids is high.
15. The ecology and Biodiversity studies indicate mostly native flora and fauna. The type plants to absorb pollutant are suggested in the EIA report.
16. The expansion of the project has positive response from public. The willingness to pay and the willingness to accept the project has positive outcome. The ratio between these two is around 1:20.09. It means that the benefits are twenty times greater than the loss. The Social and Culture vulnerability index responds very low and the level of resilience is at the higher side.
17. The project cost for expansion is Rs 10661.00 lakhs.
18. An amount of 2.5 percent of the total project cost is reserved for corporate social responsibility.